ARIDEA
SOLUTIONS

Environmental & Process Monitoring

Prepared For Alliance

About Aridea Solutions

Aridea Solutions' Mission is to deliver solutions that help drive compliance costs down by bringing innovation to environmental stewardship.

At Aridea Solutions, we envision a time where environmental parameters are continuously monitored in real-time and can be communicated with each other, machines and people to help deliver better outcomes for our industries and most importantly the environment in which we live.

Company Information

- Aridea Solutions provides unmatched design, installation and delivery services for remote environmental monitoring.

- Aridea provides solutions for utilities and the heavy industrial sector, focusing primarily on, but not limited to natural resources extraction, transportation and processing.

- Aridea Solutions provides flexible solutions that allow for the collection and aggregation of multiple environmental parameters through a single interface utilizing best of breed off the shelf sensor technology.

Company Information – cont.

- Aridea provides flexible and extensible solutions to allow organizations of any size to take advantage of the efficiencies created by utilizing Machine-to-Machine (M2M) communications and Internet of Things (IoT) technologies.

- Aridea Solutions maintains a knowledgeable staff that can engineer a solution for nearly any monitoring situation that may arise.

- Aridea Solutions is located in downtown Charleston, WV

- Email us at info@aridea.com

Environmental Monitoring

Aridea Solutions has developed *real-time* and *recorded* monitoring of environmental conditions to insure regulatory compliance.

- Water Quality Monitoring
- Air Quality Monitoring
- Weather Monitoring

Environmental Parameters

Water Quality Monitoring

Quality:

- pH
- Oxidation-Reduction Potential (ORP)
- Dissolved Oxygen (DO)
- Conductivity
- Turbidity
- Temperature

Ions:

- Calcium (Ca2+)
- Fluoride (F-)
- Fluoroborate (BF4-)
- Nitrate (NO3-)
- Bromide (Br-)
- Chloride (Cl-)
- Cupric (Cu2+)
- Iodide (I-)
- Silver (Ag+)

Air Quality Monitoring

- Temperature
- Humidity
- Pressure
- Carbon Monoxide
- Carbon Dioxide
- Ethanol
- Molecular Oxygen
- Ozone
- Nitric Oxide
- Nitric Dioxide
- Sulfur Dioxide
- Isobutane
- Toluene

- Ammonia
- Methane
- Molecular Hydrogen
- Hydrogen Sulfide
- Hydrogen Chloride
- Hydrogen Cyanide
- Hydrocarbons (VOC)
- Phosphine
- Ethylene Oxide
- Chlorine
- Particle Matter – Dust

Weather Monitoring

- Rainfall
- Temperature
- Humidity
- Barometric Pressure
- Wind Speed/Direction

Other Monitoring

- Mine Pool Elevation
- Injection Well Flow
- Water Removal Flow
- Soil Moisture
- Pump Status
- Tanks (AST)

Monitoring Information

- Aridea Solutions brings solutions to the market by understanding customer requirements and delivering solutions that leverage best in breed sensor technology. Below is a sample of the communications and sensor manufacturers Aridea utilizes to deliver results.

Conventional Environmental Monitoring

Site #1

Site #2

Site #3

Site #4

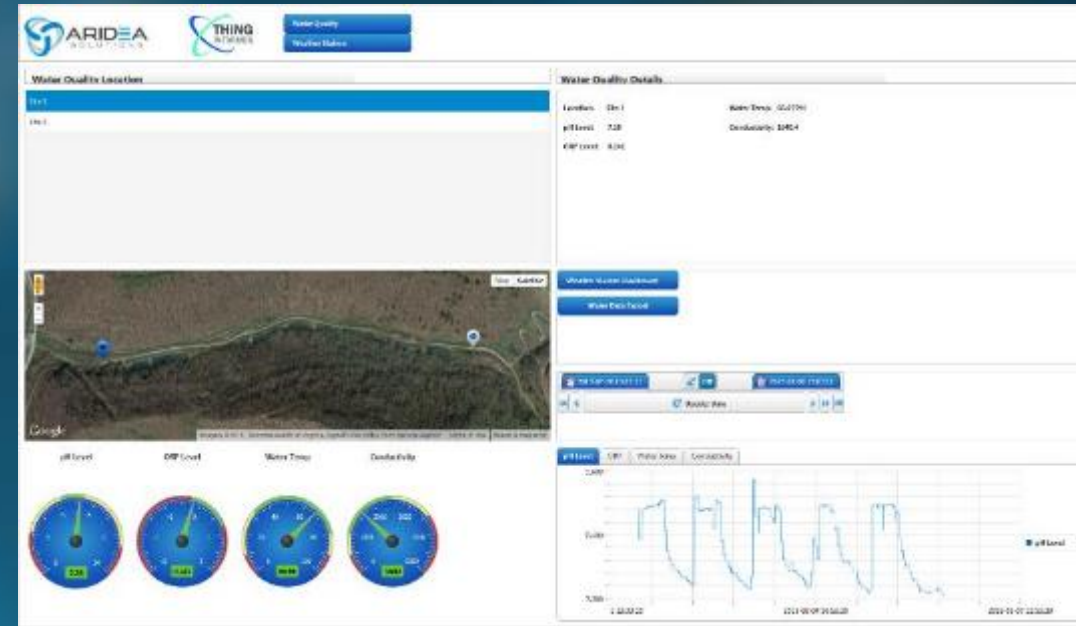# Real-time Environmental Monitoring

Site #1

Site #2

Site #3

Site #4

ThingInformer Platform

A Cloud Based, Software as Service offering that delivers critical environmental parameter data and alerts.

- Cloud Based, Software as Service
- Solar Powered
- No New Infrastructure Required
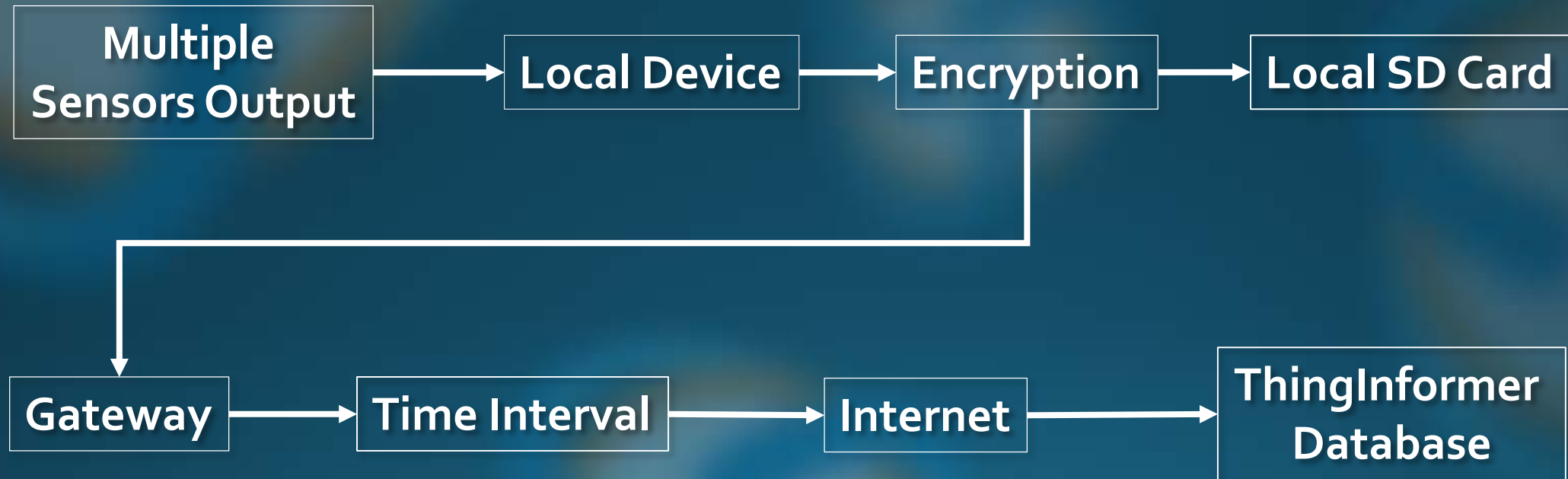- Modular, Portable, Flexible

No Location Too Remote

Advanced data integrity and diagnostics

Our system not only allows for real-time data collection and analysis, it also has built in diagnostic and data resiliency technologies that ensure that all parts of the network are healthy and data integrity is maintained.

- Encryption
- 24/7 Monitoring and Alerts
- Multi-level Data Logging
- Sensor anomaly detection

LAST COLLECTION TIME	HOURS SINCE LAST COLLECTION	BATTERY LIFE
2/28/2016 6:11:30 PM	736	97
3/23/2016 12:13:55 PM	166	95
3/25/2016 11:49:23 AM	119	18
3/30/2016 9:29:38 AM	1	97
3/30/2016 9:46:56 AM	1	97
3/30/2016 9:39:21 AM	1	42
3/30/2016 9:56:04 AM	1	96
3/30/2016 9:34:20 AM	1	98

Data Aggregation

- Historical Trends
- Comparisons
- On-the-fly Averaging and Weighting
- Shows moving Averages and Standard Deviations

The Aridea Solutions Advantage

Savings:

- Labor Costs
- Travel Costs
- Equipment Costs
- Safety Liability
- Legal Costs

New Resources:

- Better Environmental Outcomes
- Real-time Data
- Alerting
- Data Analysis
- Anytime/Anywhere Access
- Predictive Analysis
- Proactive Monitoring
- Proactive Response
- Environmentally Friendly

Case Study: Appalachian Coal Producer

- **Goal:**
  To explore how automated, continuous monitoring from our ThingInformer platform performs versus manual water chemistry monitoring.
- **Primary result:**
  The Customer receives an immediate and graphical representation of the water chemistry and makes real-time decisions on effective water treatment.
- **Secondary Result:**
  The Customer has been able to correlate several real-time events to determine if the events were temporary, natural events or if they were true chemical imbalances where additives needed to be deployed.
- **Outcome:**
  A significant reduction in chemical agents being used in water treatment and more stable water chemistry levels.

Case Study: Natural Gas Producer

- **Goal:**
  To continuously study Hydrogen Sulfide concentrations and active weather data at an active gas compressor station over a 1 month period.
- **Primary result:**
  The Customer was able to get detailed export of hydrogen sulfide levels from multiple locations on the property.
- **Secondary Result:**
  The customer was able to overlay weather data into detailed reports with the provided data.
- **Outcome:**
  The customer used the detailed hydrogen sulfide concentrations in correlation with simultaneous weather events (ie. wind speed and direction) to aid in isolating possible leaks and maintain environmental compliance.

Case Study: Environmental Services

- **Goal:**
  To explore the effect of automated weather reporting versus manual weather data collection.
- **Primary result:**
  The Customer received real-time weather data via our ThingInformer platform to allow more efficient data collection without user error.
- **Secondary Result:**
  The Customer was able to leverage real-time alerts from our ThingInformer platform to take immediate action when key weather thresholds were breached.
- **Outcome:**
  The Customer was able to achieve more accurate and timely information at a lower cost as opposed to sending environmental engineers to the field for manual collection. Furthermore the customer realized added benefit by using ThingInformer alerts to take more proactive measures to weather related issues.

Case Study: Leading Crop Nutrient Producer

- **Goal:**
  To provide a solution to leverage new technology to lower communications, power and labor costs associated with monitoring hundreds of remote sensors.
- **Primary result:**
  The solution provided allows the customer's existing sensors to be greatly consolidated with our proprietary configuration of low powered communication nodes.
- **Secondary Result:**
  The solution provides the ability view a variety of sensors via a common interface.
- **Outcome:**
  The solution greatly lowers the customer's cost of maintaining a large network of sensors. The customer also gains efficiency and standardization with heterogeneous sensors being displayed in a common format and interface.

In Conclusion

- The Aridea Solution provides real time environmental monitoring with hardware that requires no new infrastructure no matter how remote the sites may be.

- Aridea Solutions brings the Internet of Things platform to Industries that require Environmental monitoring. This data from multiple sites and parameters can be viewed from a single pane dashboard anywhere with an Internet connection or mobile phone.

- All data is encrypted from the source through transmission for data security.

- The Aridea Solution provides a significant cost savings versus manual sampling.

- These solutions are field proven.